



Gold Hydrogen

Natural Hydrogen Discovery in South Australia
An Overview of the Ramsay Project

Neil McDonald – Managing Director

Japan Hydrogen Summit

**The Gold Standard
in Green Energy**

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Prospective Resource Statements

The Prospective Resource Statements for Natural Hydrogen and for Helium have been included in presentation under the approval of Mr Billy Hadi Subrata, Chief Engineer for Gold Hydrogen, who is a Qualified Petroleum Reserves and Resources Evaluator. Mr Hadi Subrata confirms that, as at the date of this announcement, there is no change to information or additional information, since the effective dates, that would materially change the estimates of prospective resources quoted.

QPRRE Statement – Natural Hydrogen

The Prospective Resource Statement for Natural Hydrogen in this presentation is based on, and fairly represents, information and supporting documentation prepared by independent consultants "Teof Rodrigues & Associates" with an effective date of 30 September 2021, and which forms part of the Company's Replacement Prospectus dated 29 November 2022. The Prospective Resource Statement, together with all relevant notes, also appears in the Company's ASX releases of 13 January 2023 and 30 October 2024.

QPRRE Statement - Helium

The Prospective Resource Statement for Helium in this announcement is based on, and fairly represents, information and supporting documentation prepared by independent consultants "Teof Rodrigues & Associates" with an effective date of 21 February 2024, and which was announced by the Company on that date (as well as 30 October 2024) together with the accompanying assumptions and notes.

Executive Summary – Natural Hydrogen and Helium



Title over certified Prospective Resources

1.3 billion kg of natural Hydrogen¹
41 Bcf of Helium¹
 (with a mean of 96 Bcf)



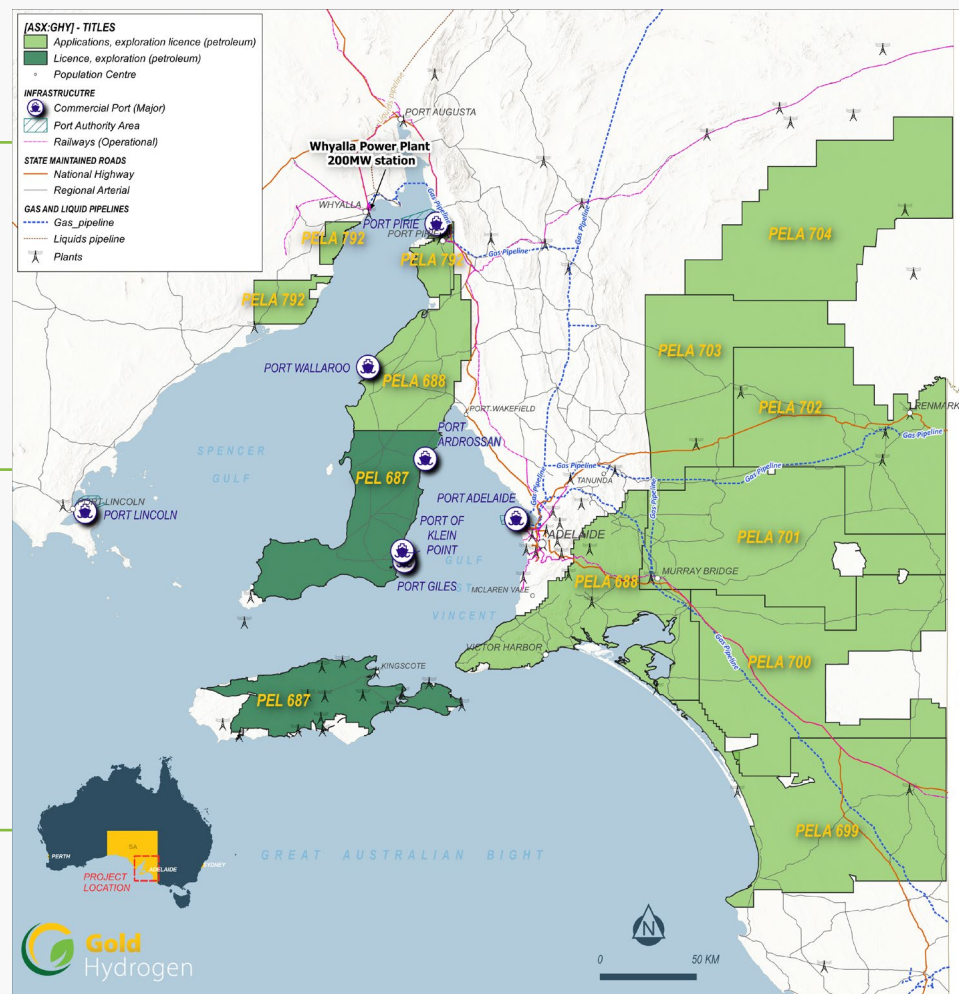
Ramsay Project 100% owned

7,820 km²
 plus a further **69,472 km²** under
 exclusive application



High purity gas sample levels²

95.8% Hydrogen
Up to 36.9% Helium
 Helium-3 Detected in Samples



Engagements to date with leading global experts and contractors

CSIRO, Schlumberger, Total Seismic, Xcalibur, Savanna Energy Services



Commercial and environmental competitive advantages

Natural hydrogen provides **cost and emission advantages** over other production sources



A number of global gas projects are **commercial with much lower concentrations of helium** (<1% helium as a by-product)

¹ Prospective Resources are based on un-risked Best Estimate. Refer Slide 10 for full details.

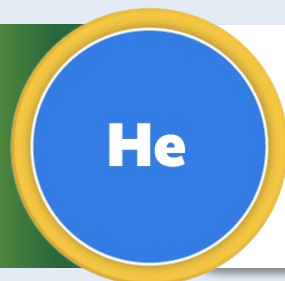
² Laboratory gas sample analyses - air corrected. Refer ASX releases of 27 May 2024, 2 August 2024 and 17 October 2024.

Hydrogen and Helium to Date in PEL687

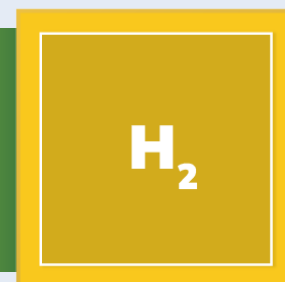
Extensive regional play across 7,400 km² permit area



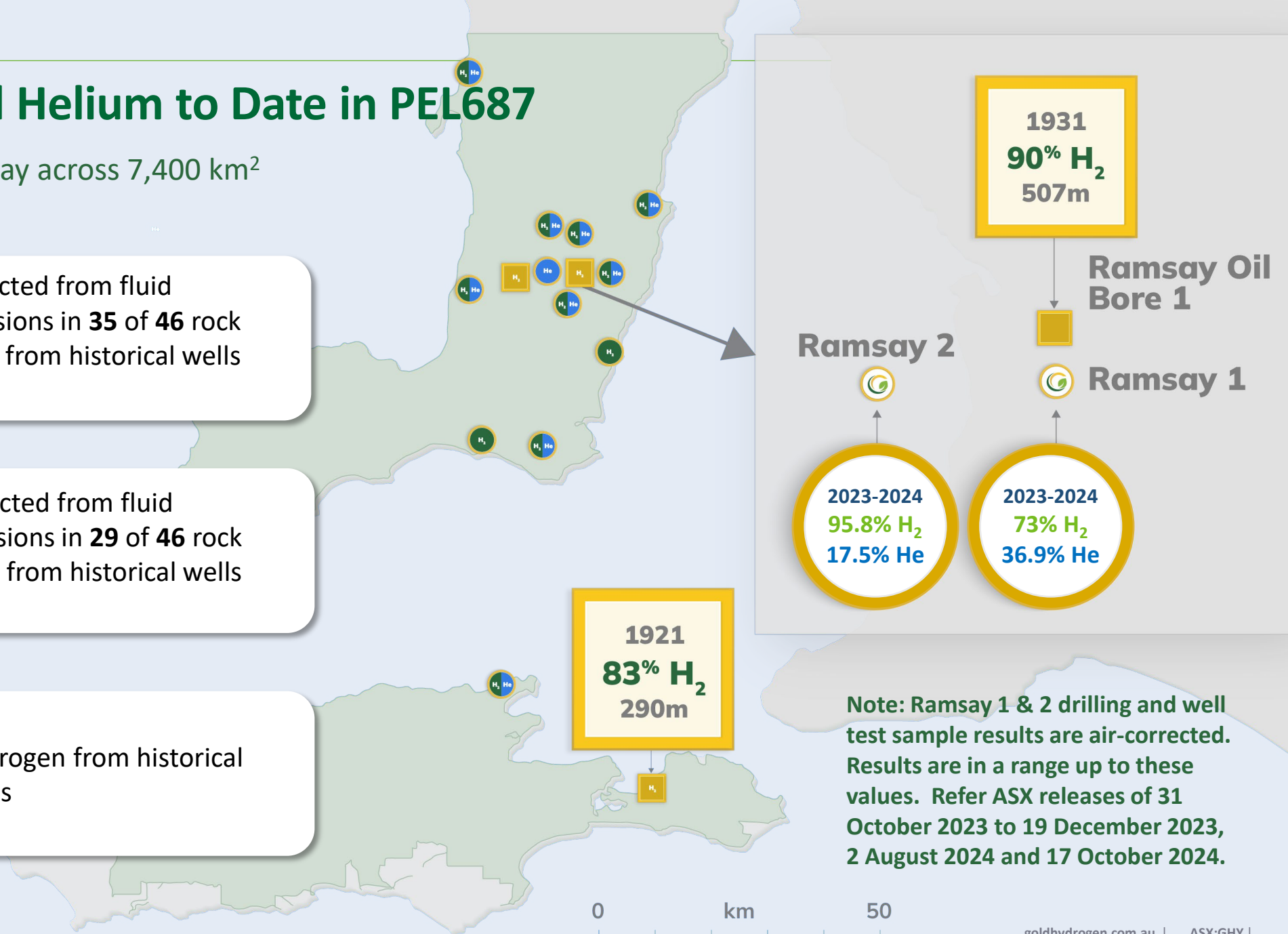
Extracted from fluid inclusions in **35** of **46** rock chips from historical wells



Extracted from fluid inclusions in **29** of **46** rock chips from historical wells



Hydrogen from historical wells





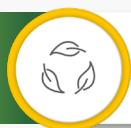
Industry Overview



Key Trends: Hydrogen

Hydrogen demand is forecast to include heavy transportation, ammonia production, steel manufacturing, and various energy uses. Future growth will be driven by key adoption trends and the drive towards decarbonisation.

Key drivers for Hydrogen adoption trends



ESG investment and decarbonisation policies



Hydrogen as an energy, industry & transport source



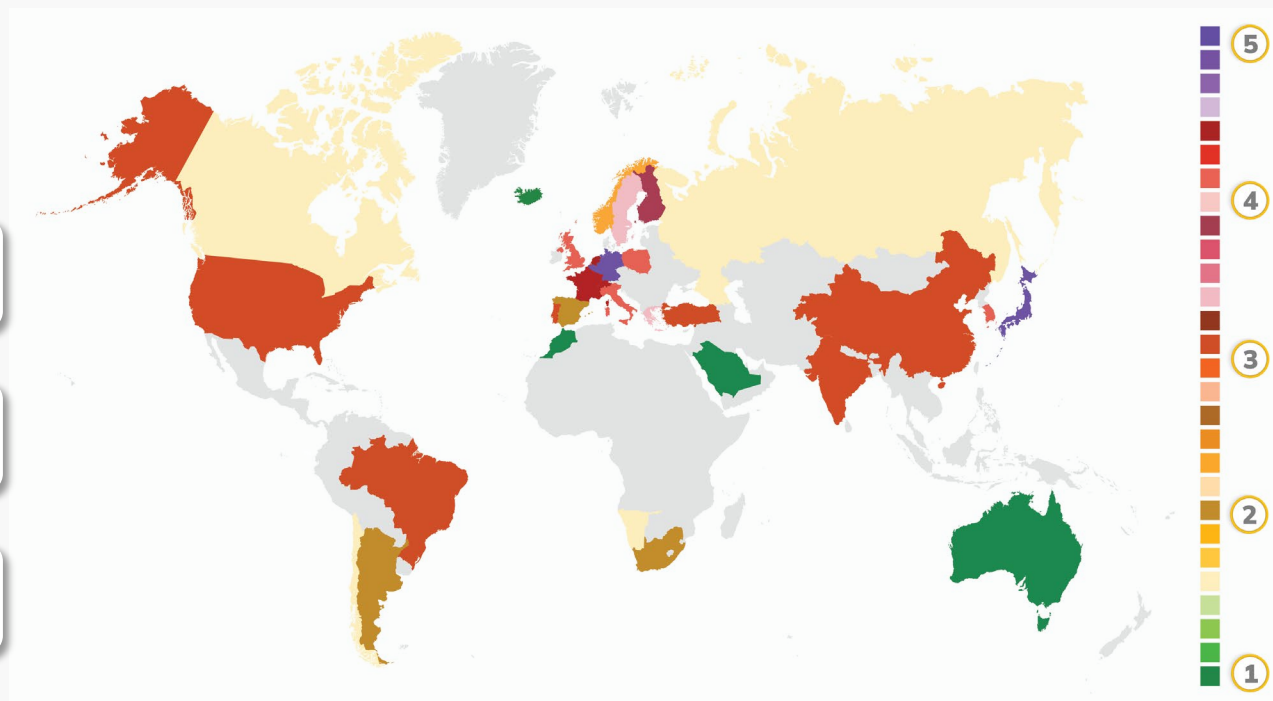
Advances in hydrogen technology



Hydrogen boosts grid and industrial flexibility

Likely exporters / importers¹

Australia has been identified as a likely exporter of natural hydrogen given its undeveloped land and renewable energy strategies

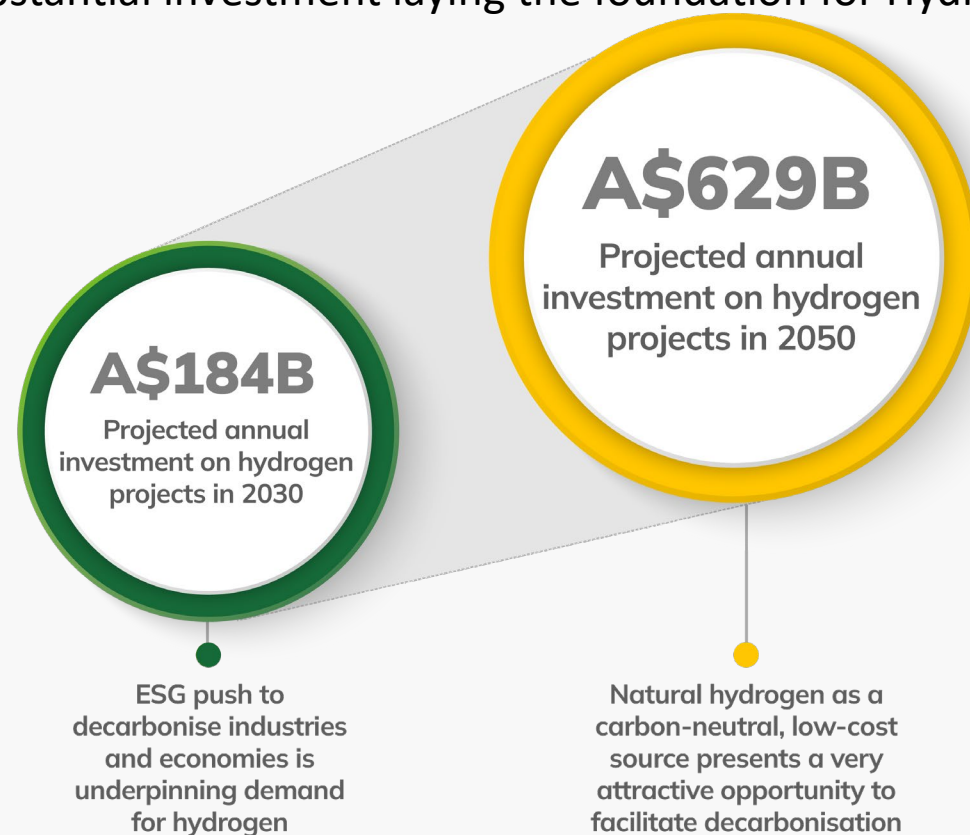


1 = Strongly export-oriented, 2 = Slightly export-oriented,
3 = Neutral, 4 = Slightly import-oriented, 5 = Strongly import-oriented

¹ Source: PwC, <https://www.pwc.com/gx/en/industries/energy-utilities-resources/future-energy/green-hydrogen-cost.html>

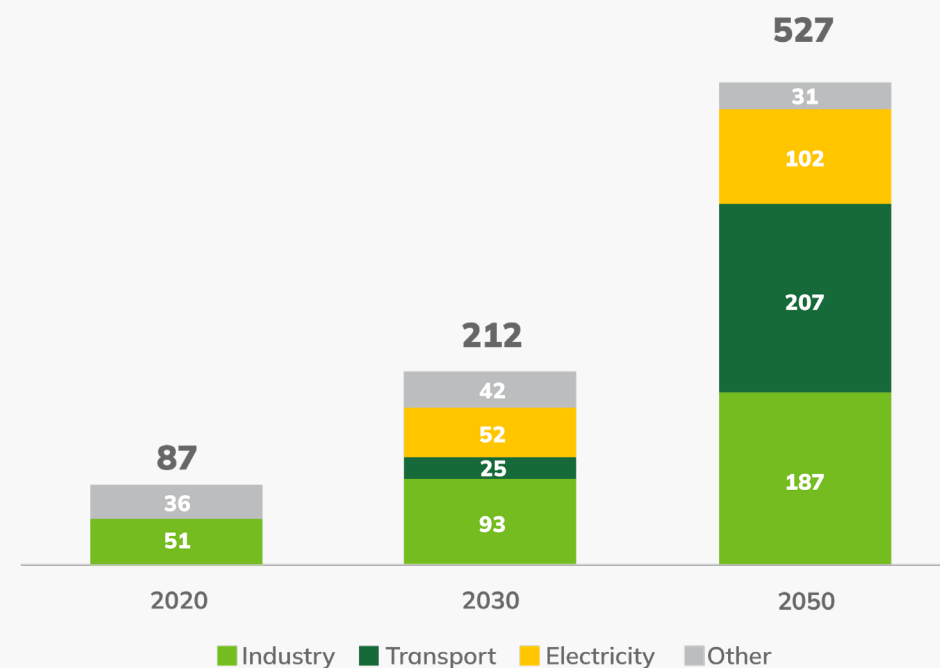
Global Hydrogen Forecast

Substantial investment laying the foundation for Hydrogen use



Source: Frost & Sullivan Report - Page 29 of Gold Hydrogen Prospectus

Global Hydrogen Demand by Sector, Net Zero Emissions Target Scenario (Mt)



Source: International Energy Agency, Oct-2021 1. Other includes buildings, agriculture and refineries

Types of Hydrogen Production

Naturally occurring Hydrogen offers significant cost and / or carbon advantages relative to other Hydrogen production (manufacturing) processes

Gold Hydrogen is exploring for 'gold' or 'white' (natural) Hydrogen

Gold / White
(natural)



Energy source	Natural hydrogen	Natural gas	Coal	Natural gas / coal	Renewables / biomass
Environmental impact	Low	High	Very High	Low	Low
No thermal process	✓	✗	✗	✗	✗
Production cost (A\$/kg) ^{1,2}	\$1.00	\$5.60	\$6.20-\$6.40	\$10.20-\$10.30	P: \$6.40-\$25.50 A: \$4.70-\$23.20
Cost comparable to existing power generation ³	✓	✗	✗	✗	✗

Source: Frost and Sullivan, Sep-2022 (Refer Gold Hydrogen Replacement Prospectus dated 29 November 2022)

1. Source: Christophe Rigollet¹, Alain Prinzhofer^{2,3}, Natural Hydrogen: A New Source of Carbon-Free and Renewable Energy That Can Compete With Hydrocarbons, First Break, Volume 40, Issue 10, Oct 2022, p. 78 – 84

DOI: <https://doi.org/10.3997/1365-2397.fb2022087>; "The Bourakébougou field, in Mali, represents the first natural hydrogen deposit studied both scientifically and industrially. It gives us information on its renewability, on the natural flows involved and therefore on its sustainable exploitation. It is possible to estimate that the cost of operating hydrogen would be less than \$1/kg, which is significantly cheaper than any manufactured hydrogen, whether green, grey, or blue. Equivalent work is in progress in other continents, in order to be able to compare our knowledge of this Malian field with other fields in the world, which will make it possible to better ensure the industrial and societal interest of R&D for this new field." Available on the Gold Hydrogen website.

2. P = Polymer electrolyte membrane electrolysis. A = Alkaline Electrolysis. Gold Hydrogen cost is an estimate

3. For industrial buyers, a hydrogen offtake price of €3 (\$4.50) per kg would be required to incentivise hydrogen production over power generation

Key Drivers for Helium



The global wholesale helium market is expected to grow from an estimated **US\$5bn in 2023** to over **US\$8bn in 2030¹**

There are commercial global gas projects with significant lower helium concentrations (>1%)

Indicatively pricing is currently approximately **USD400-500 per Mcf** (thousand cubic feet)
(Source: Kornbluth Helium Consulting)

¹ Source: USGS, 2023: <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-helium.pdf>

² Air-corrected laboratory analyses for Helium purities. Refer ASX releases of 2 August 2024 and 17 October 2024.

Gold Hydrogen Prospective Resources (Using PRMS guidelines)

Certified Prospective Hydrogen Resources, existing occurrences and drill ready hydrogen prospects (calculated volume not determined)

Unrisked Prospective Hydrogen Resources, PEL 687			
SPE-PRMS Sub-Class Category	Low Estimate (kTonnes)	Best Estimate (kTonnes)	High Estimate (kTonnes)
Prospect	165	1135	8050
Lead	42	178	770
Total	207	1313	8820

Certified Prospective Helium Resources, Ramsay Field (PEL 687 Yorke Peninsula)

Unrisked Prospective Helium Resources, PEL 687			
SPE-PRMS Sub-Class Category	Low Estimate (Bscf)	Best Estimate (Bscf)	High Estimate (Bscf)
Prospect Ramsay Fault Block	2	8	38
Prospect South of Ramsay Fault Block	5	33	205
Total	7	41	243

See ASX releases of 13 January 2023 and 30 October 2024 (Hydrogen) and 21 February 2024 and 30 October 2024 (Helium) for full details and notes

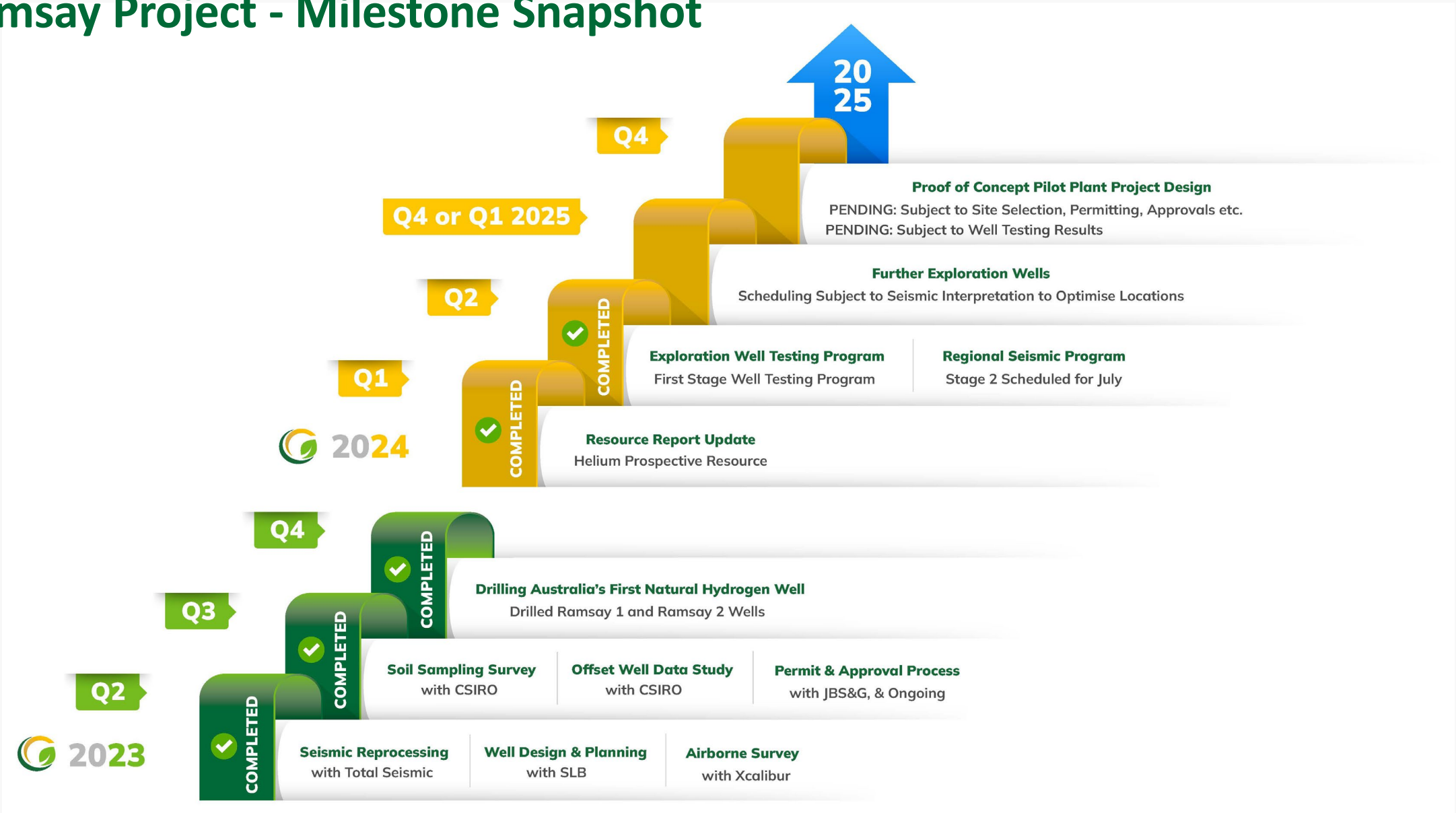
NOTE - All estimates are unrisked and aggregated arithmetically by category, hence caution that the aggregate low estimate maybe a conservative estimate and the aggregate high estimate maybe very optimistic estimate due to the portfolio effects of arithmetic summation. The estimated quantities of hydrogen and / or helium that may potentially be recovered by the application of future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery (Pg), risk of development (Pd) and risk of commercialization (Pc). Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially recoverable hydrogen and / or helium.



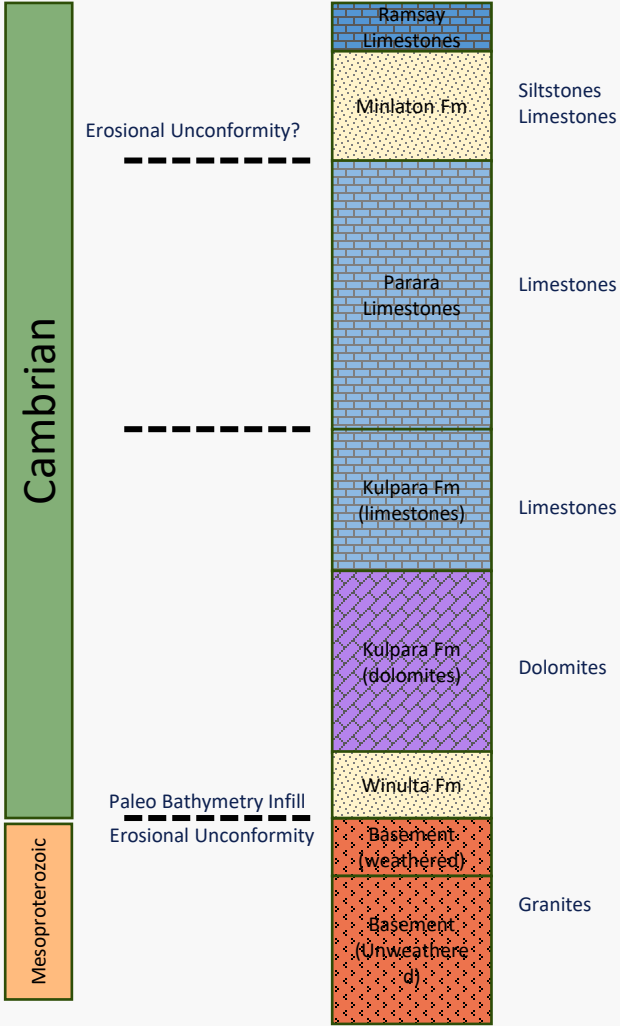
Results



Ramsay Project - Milestone Snapshot



Ramsay 2 – Hydrogen and Helium



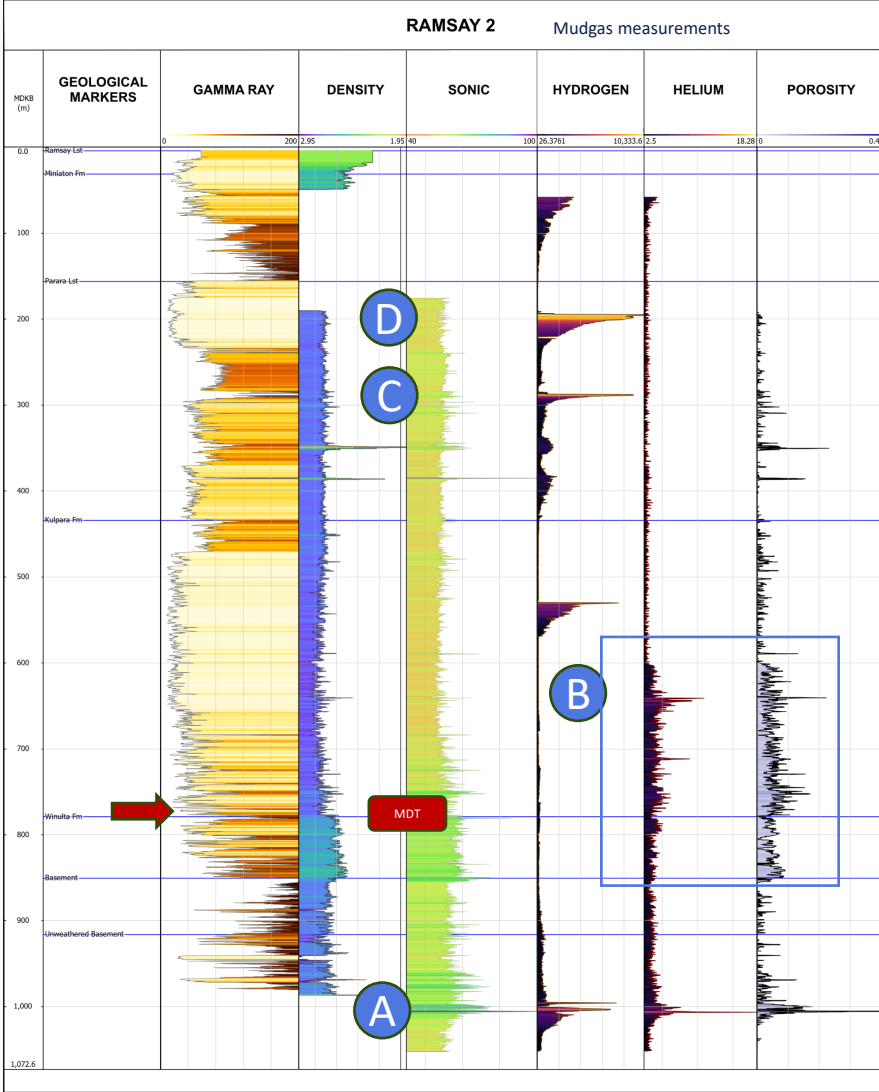
Ramsay 2 located ~526m to the West of Ramsay 1 along the seismic line and ~20m updip the structural trend.

No losses, H₂ and He in the mudgas and full logging suite.

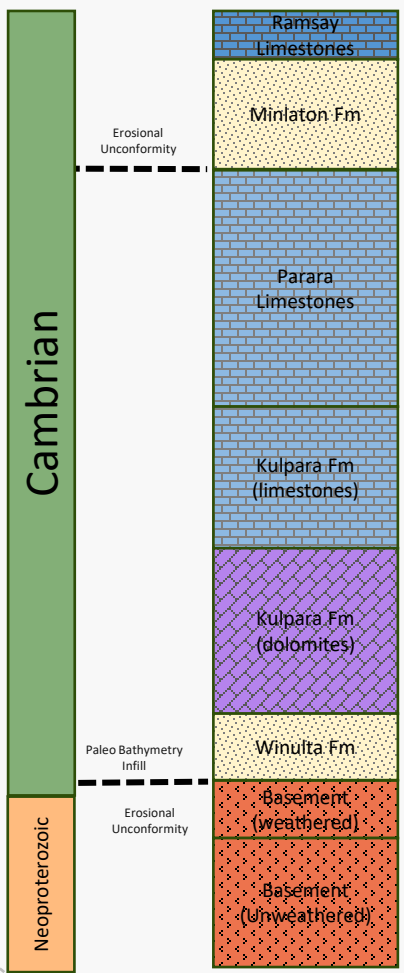
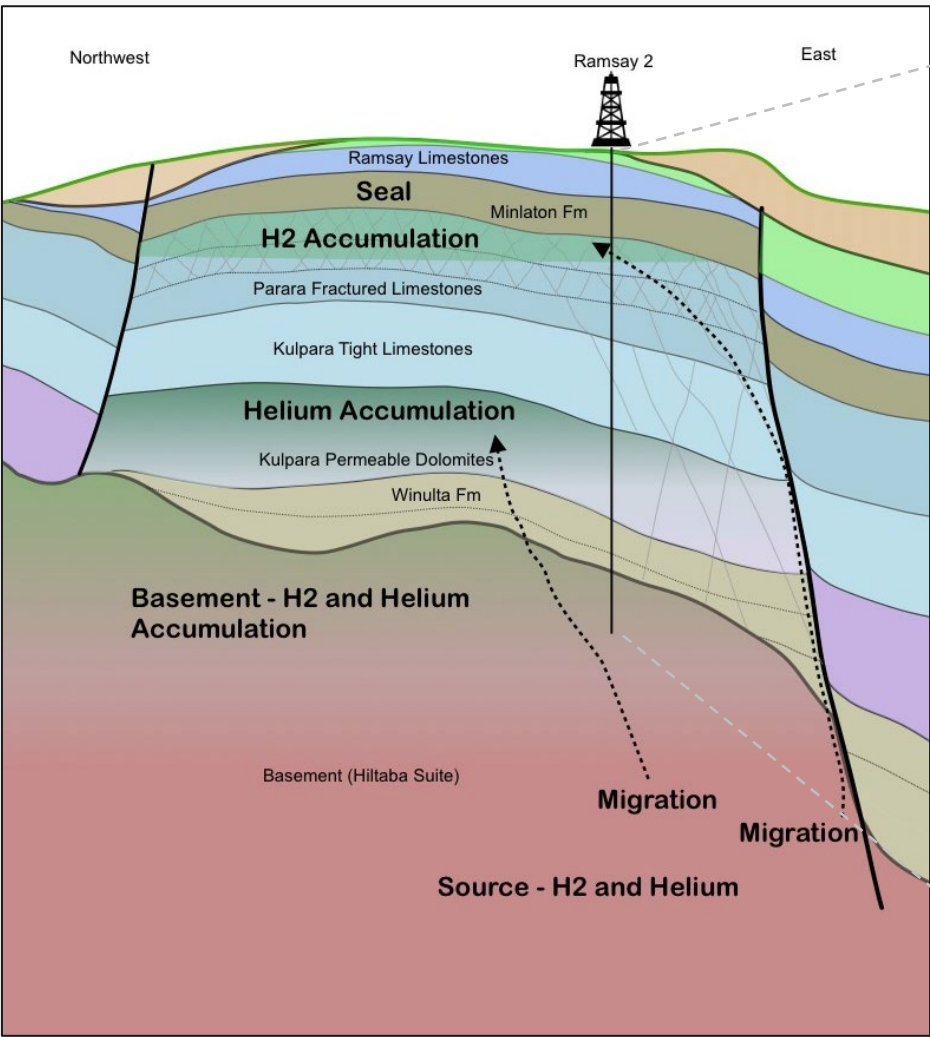
Cased and cemented, ready for selected perforations during stage 1 well testing.

MDT

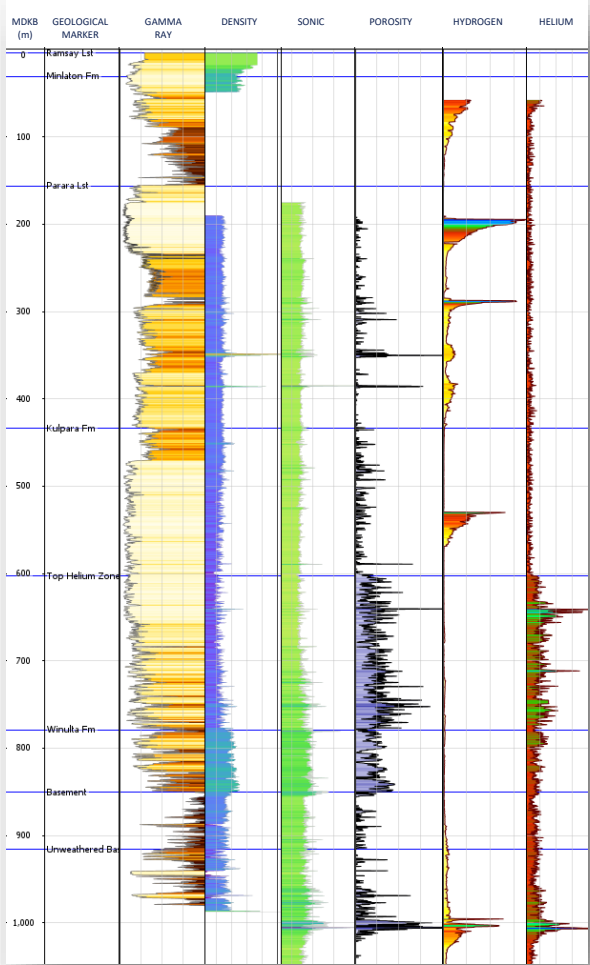
Gas from MDT sample from 778 mMD reveals very high helium concentrations (17.5% He air corrected).



Geologic Model of the Ramsay Project Hydrogen and Helium



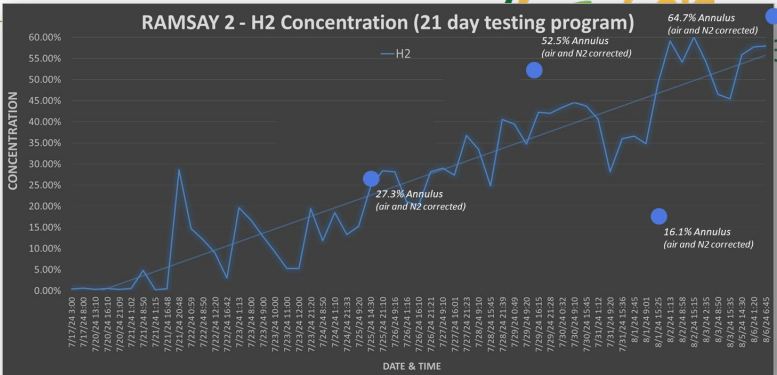
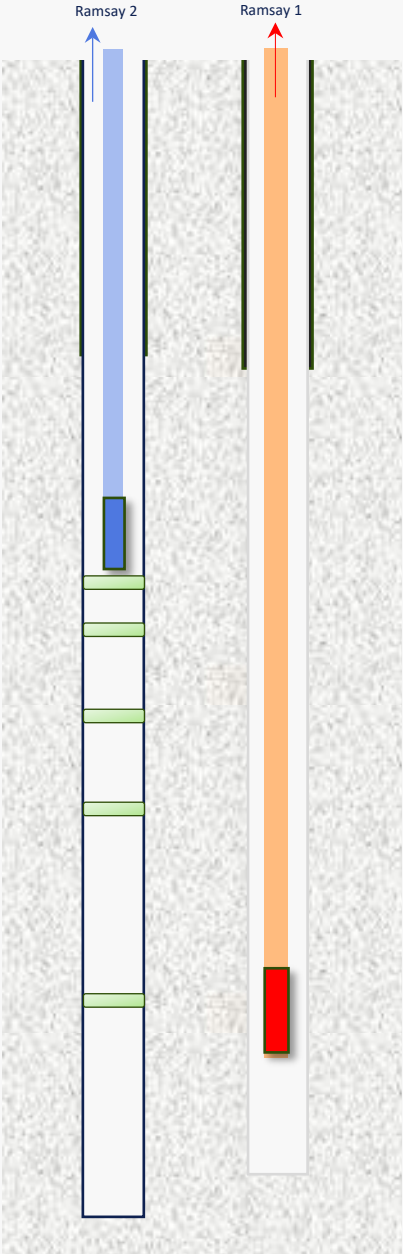
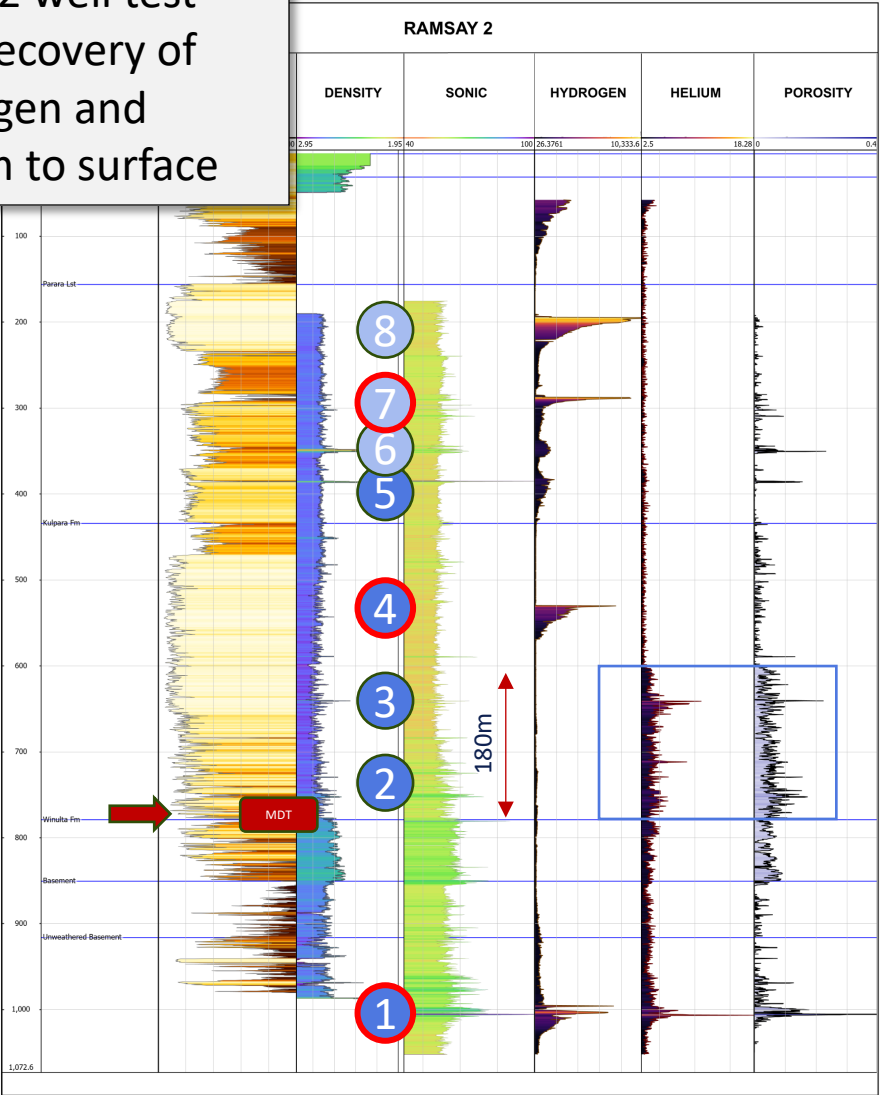
Ramsay 2



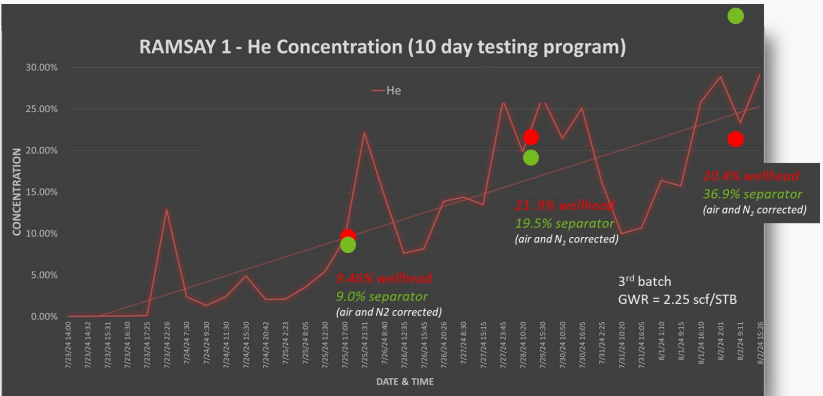
Ramsay 1 & 2 Well Test Results

Stage 2 well test with recovery of hydrogen and helium to surface

Ramsay 2



Ramsay 2 hydrogen gas to surface in annulus from ~310mMD (air and nitrogen corrected)



Ramsay 1 Helium gas to surface on separator from ~850mMD (air and nitrogen corrected)

Well Testing Program – Objectives



Primary Objective – Obtain gas samples for international analysis

Achieved

Secondary Objective – Extract gases to surface, including in formation fluid

Achieved

Conduct both open hole (R1) and isolated zone (R2) testing

Achieved

Analyse samples for purity and isotopic composition

Achieved

Facilitate initial Pilot Project planning and design:

- Hydrogen to energy
- Helium bottling plant

**Initial
discussions**

Exploration Well Testing Program – Isotopic Analysis Results

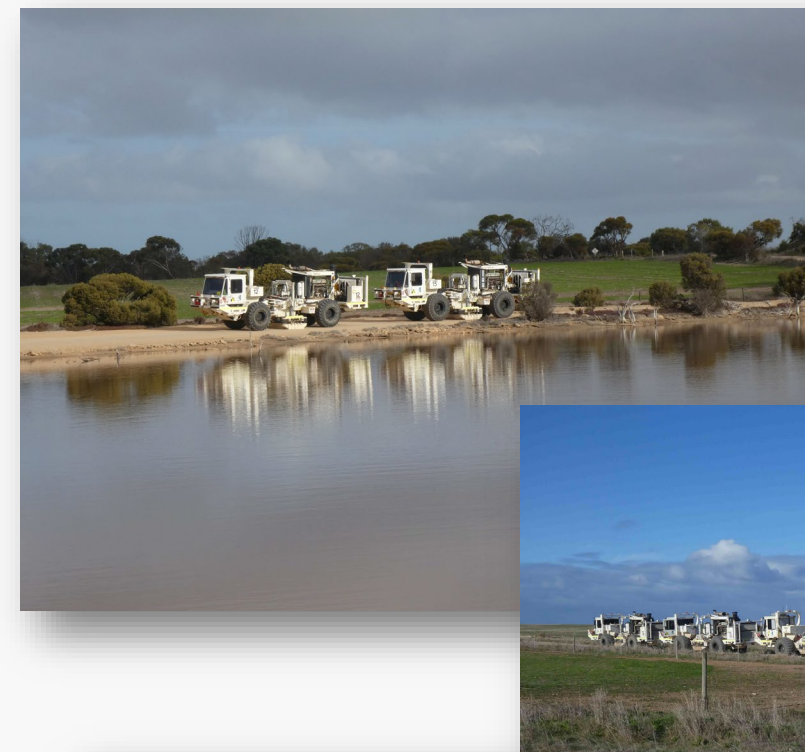
- **Helium-3** detected by independent international laboratory testing of Ramsay helium samples.
- Levels of Helium-3 have been confirmed up to the magnitude of 901 ppt (atmospheric Helium-3 is 7.2 ppt).
- The isotopic analysis results from samples tested suggest up to 3.47ppb Helium-3 within a 36.9% Helium sample.
- Helium-3 is extremely rare and valuable, with current prices of approx USD18.7 million per Kg.
- Nuclear fusion and quantum computing are emerging future markets for Helium-3.
- A single 1 GW fusion plant could require up to 100 kg of Helium-3 annually, representing a potential market worth \$1.4 billion per 1 GW fusion plant.
- Extracting and separating Helium-3 from Helium-4 as part of a natural gas project could be a viable alternative to Lunar-based mining for Helium-3.
- Refer ASX release of 30 October 2024 for full details and further reading about Helium-3.

Ramsay 2D Seismic Data

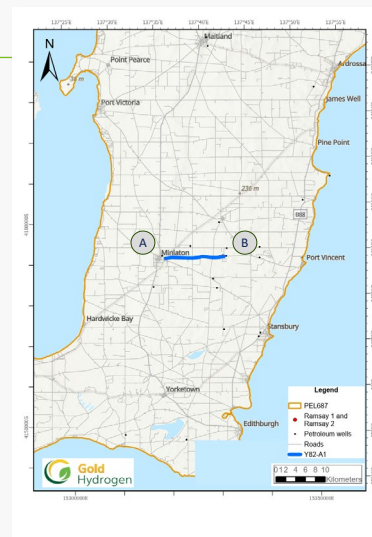
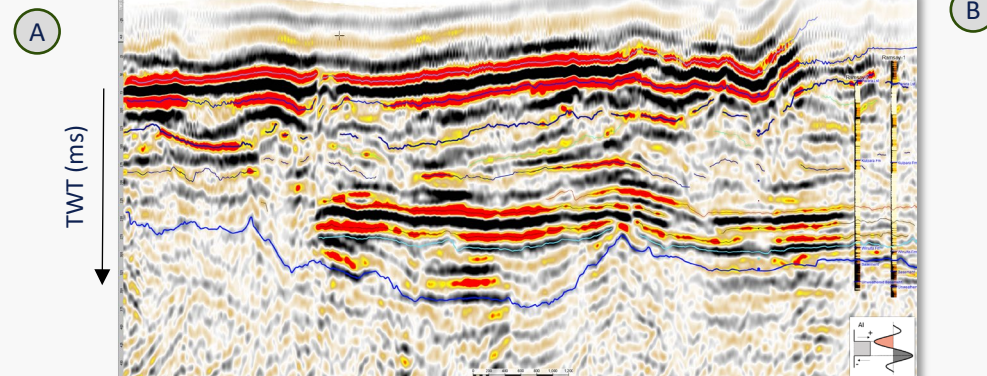
Regional 2D seismic survey acquired June/July 2024



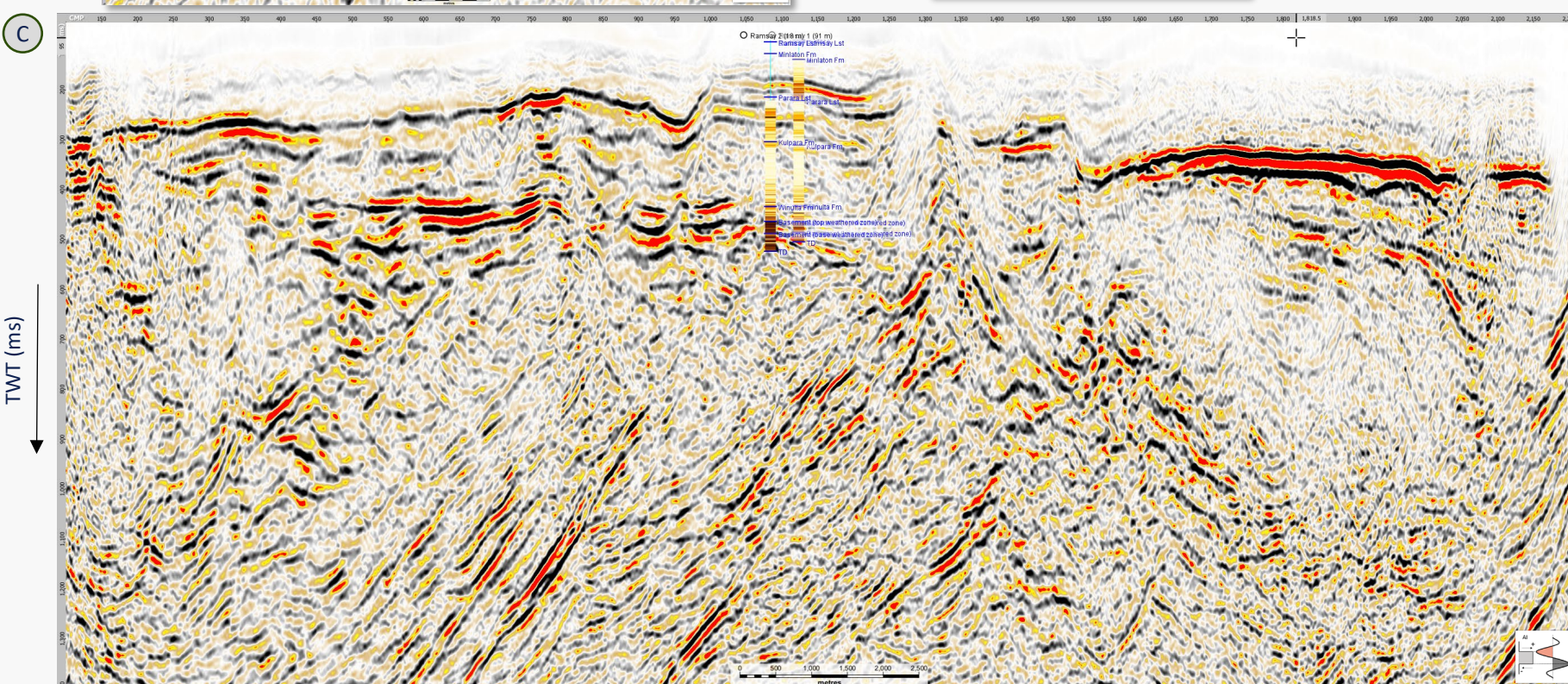
Ramsay 2DSS was acquired in June and July 2024 and consists of 575km of modern 2D data covering the Ramsay project area and the potential exploration opportunities.



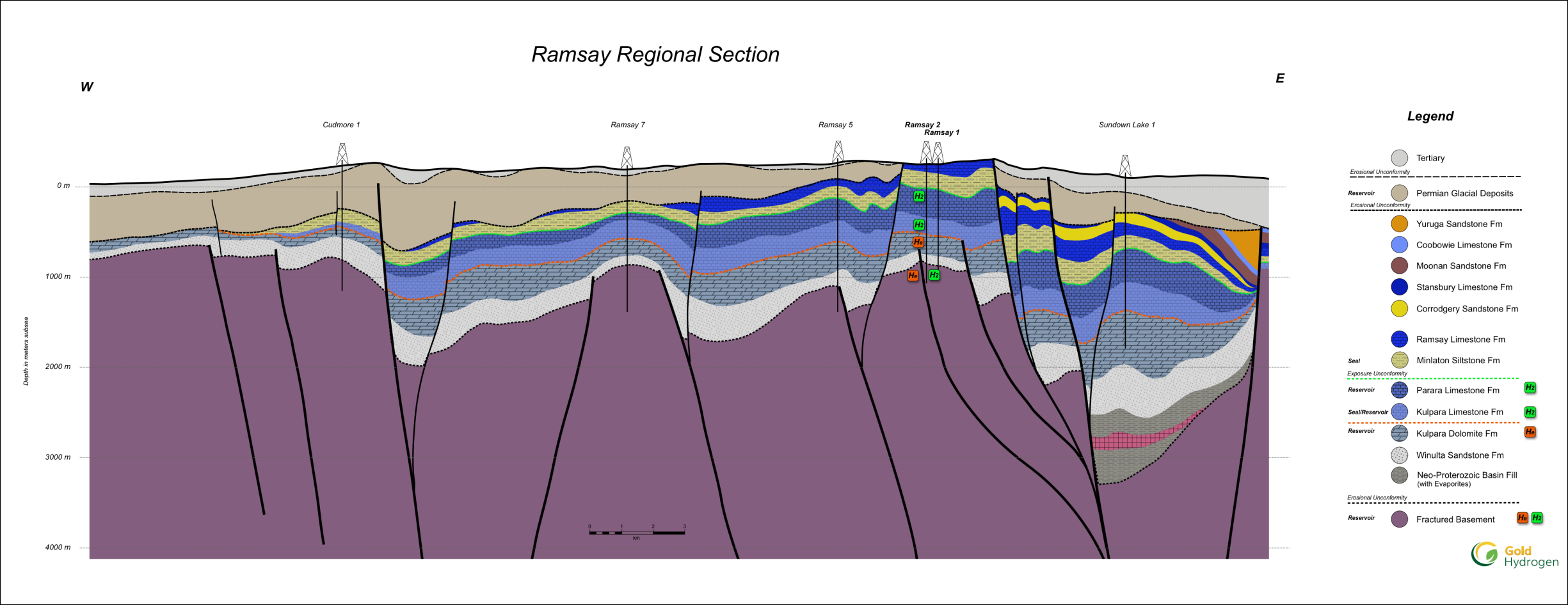
Ramsay 2D Seismic Survey



Post Stack Migrated data from Ramsay 2D seismic survey



Regional Geological Section Yorke Peninsula





Next Steps



Post-Well Testing – Objectives

A black and white photograph of an industrial drilling rig. The rig is a large, complex structure with a tall derrick and various mechanical components. Several workers in hard hats and safety gear are visible around the base of the rig, engaged in operations. The background shows a flat, open landscape under a clear sky.

Review resource reporting and resource maturation opportunities

Interpretation and analysis of 2D Seismic Program results

Site and well design selection – further Ramsay wells

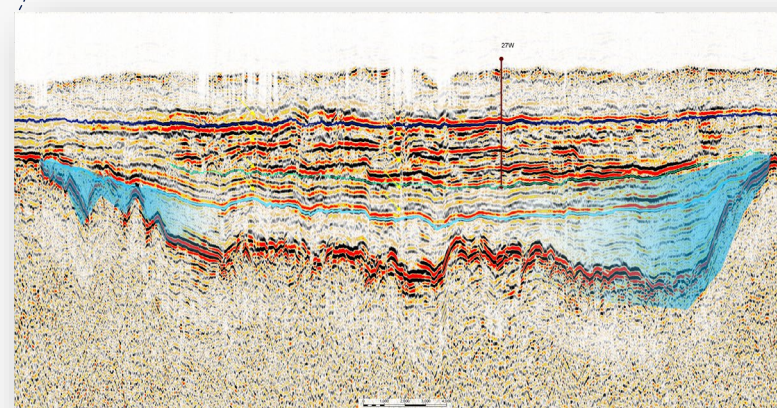
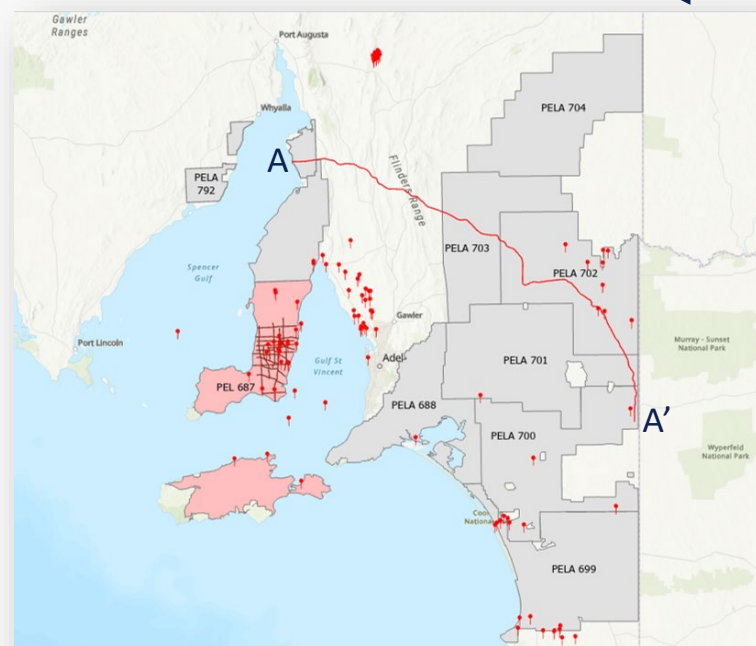
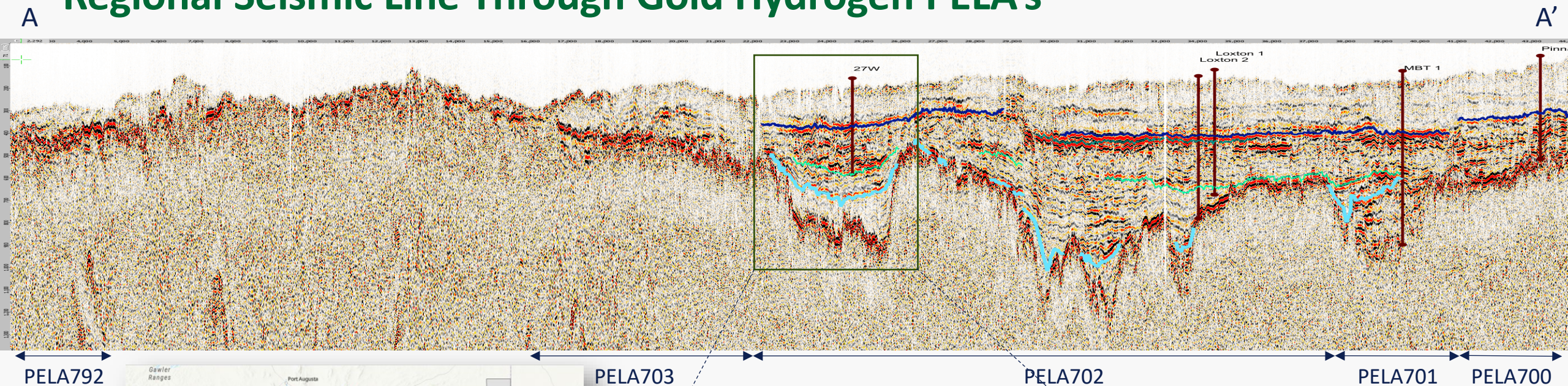
Site and well design selection – wider Yorke Peninsula plays

Initial Pilot Project – analysis, planning and design:

- Hydrogen to energy
- Helium bottling plant

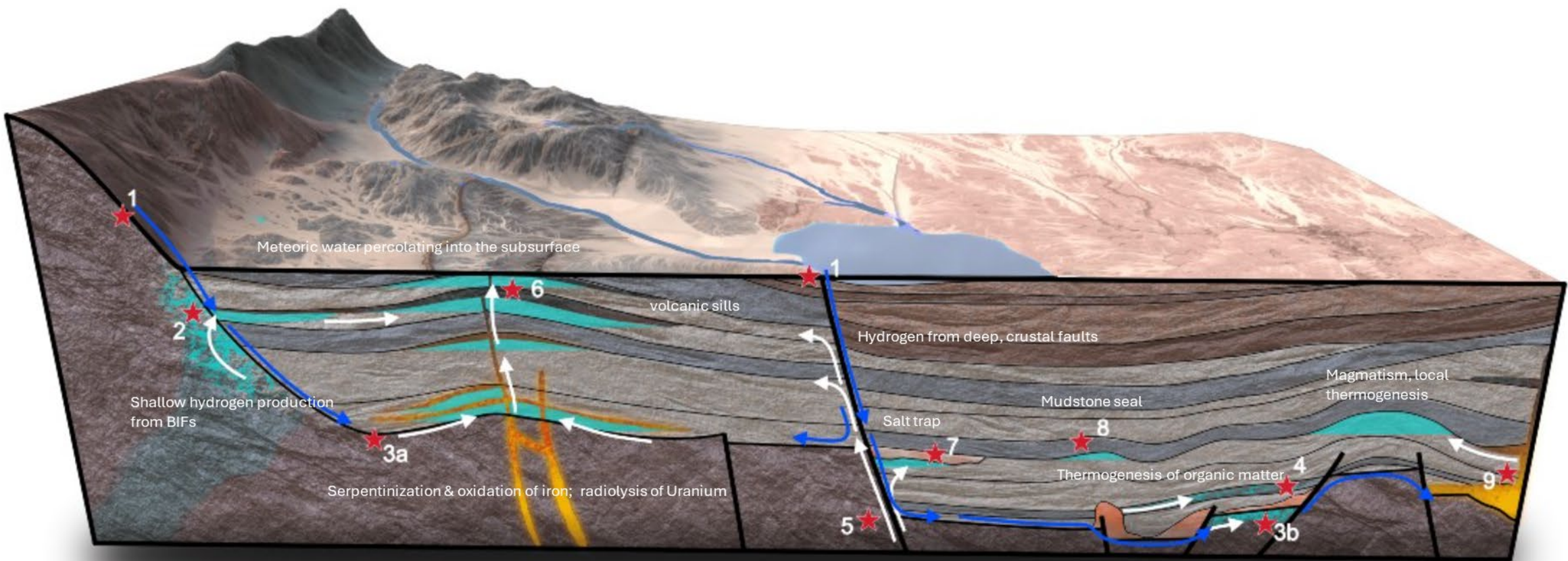
Progress Gold Hydrogen / Byrock / White Hydrogen application areas

Regional Seismic Line Through Gold Hydrogen PELA's



Regional Seismic line acquired by GA in 2022 (22GA-DL-1 DMOSTack)

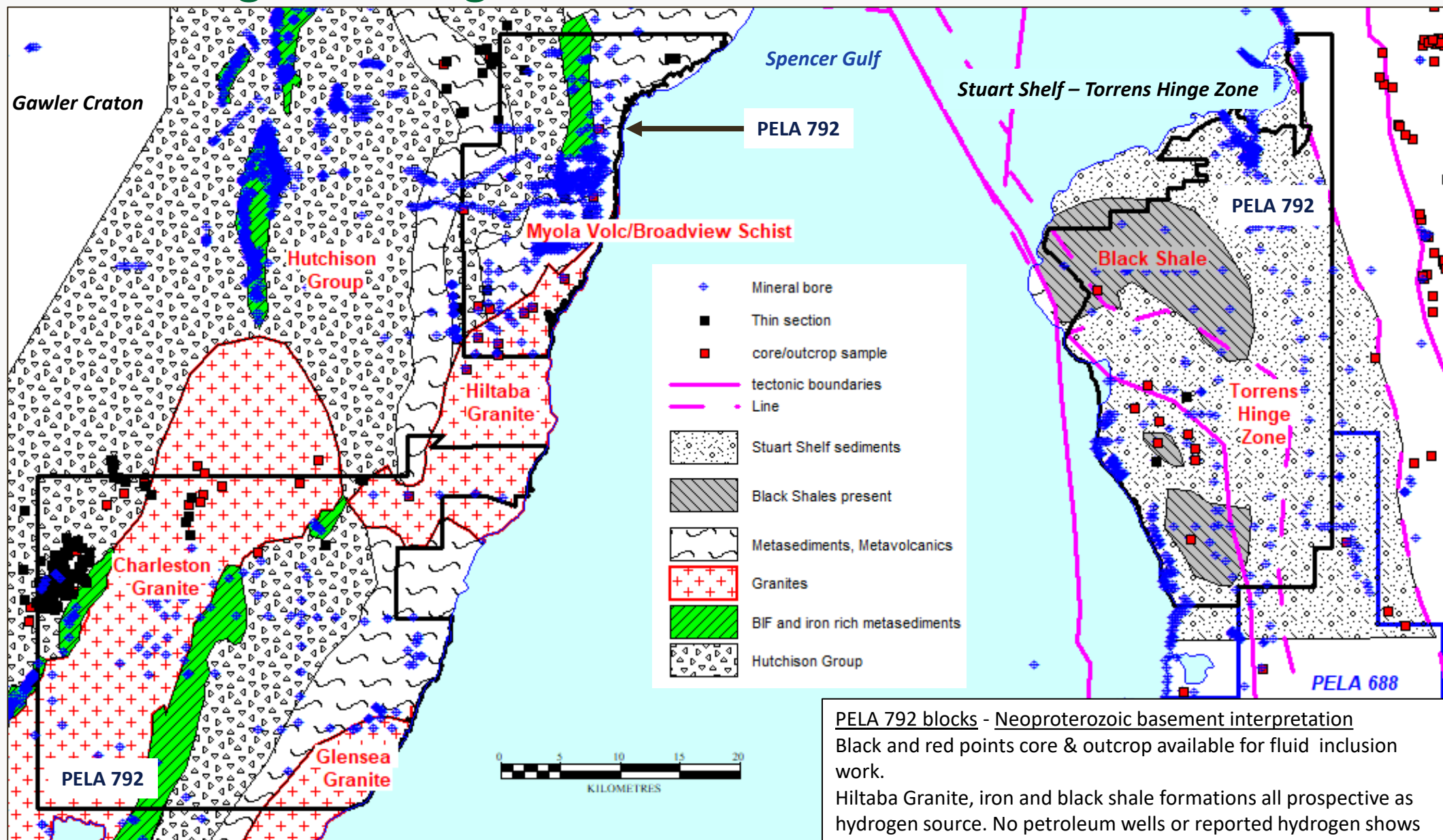
Regional Modelling



Modified from Lina Jakaite (Strike-Dip)

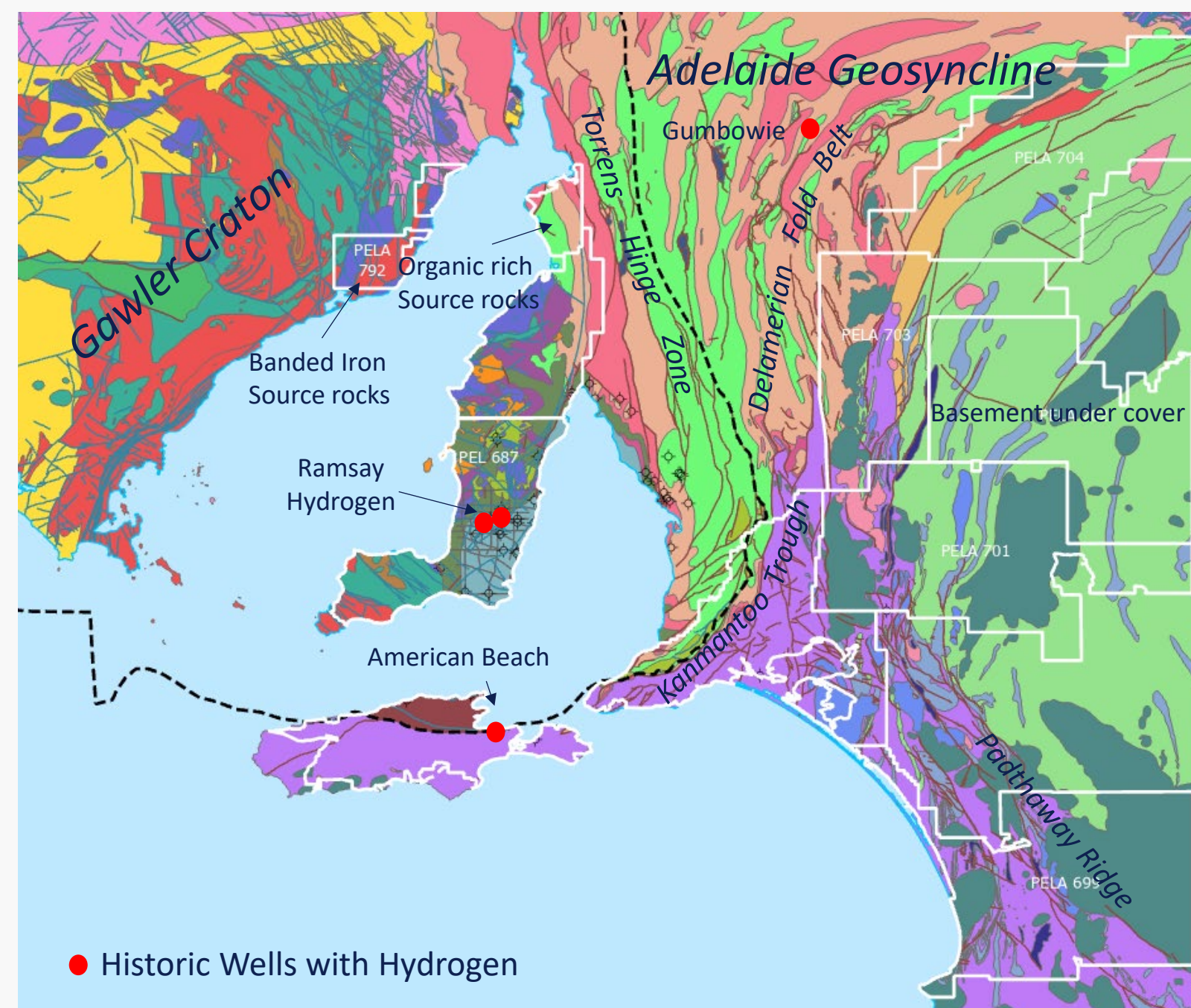
REGIONAL MODEL - HOW HYDROGEN DEPOSITS FORM

PELA792 – Geological Setting



Regional Hydrogen Applications – Byrock & White Hydrogen (100% subsidiaries of Gold Hydrogen)

- Work programs do not commence until grant
- Programs include airborne and satellite surveys and remote hydrogen detection, soil gas sampling, drilling
- Prospective Early Cambrian and Neoproterozoic trough/rift sequences including gneiss, granites and ultramafics which underlie Permian to Recent cover





Key Team



Key Management



Neil McDonald
Founder & Managing Director

Neil McDonald, with over 20 years of experience in the energy and minerals sectors across Australia, has worked on major exploration projects from greenfield to early development. He is a graduate of the Australian Institute of Company Directors.



Peter Bubendorfer
Chief Geologist

Peter has extensive experience in exploration within the oil & gas industry across Australia, specifically regarding natural gas and CSG, these being gases which correlate well with the Company's Hydrogen and Helium gases. He has specific experience in the identification of gas-related leads and plays, the establishment and running of exploration programs, seismic interpretation, dataset analysis, governmental liaison and reporting, and all aspects of geological project assessment and fieldwork.



Frank Glass
Chief Exploration Adviser

Frank Glass is a respected geologist with over 30 years of experience in oil, gas, and natural hydrogen exploration, including a decade with Shell. He holds a Master's in Structural Geology from the University of Amsterdam and memberships in the Petroleum Exploration Society of Australia and the European Association of Geoscientists and Engineers.



Billy Hadi Subrata
Chief Technical Officer

Billy Hadi Subrata is an experienced petroleum and reservoir engineer with 20 years of expertise in exploration, development, and energy transition. He has significant skills in reservoir simulation, field appraisal, reserves estimation, and project management, and has been a key figure at Gold Hydrogen since its inception in 2021. Billy is a Qualified Petroleum Reserves and Resources Evaluator and a member of SPE and Engineers Australia.



Julien Bourdet
Geological Advisor

Julien Bourdet is a geological advisor to Gold Hydrogen. He worked for 16 years at CSIRO conducting research aiming at evaluating geological fluid and diagenesis and delivered petrological and fluid inclusion consulting. He has extensive contributions in the field of oil and gas exploration and development and on the natural hydrogen systems. He earned his PhD at the University of Lorraine in France.

Board of Directors



Neil McDonald
Founder & Managing Director

Neil McDonald, with over 20 years of experience in the energy and minerals sectors across Australia, has worked on major exploration projects from greenfield to early development. He is a graduate of the Australian Institute of Company Directors.



Alexander Downer
Independent
Non-Executive Chair

Alexander Downer, a prominent Australian politician and diplomat, has held top roles including Leader of the Liberal Party and Minister for Foreign Affairs. Before politics, he was an executive director at the Australian Chamber of Commerce. He currently serves on boards like Hakluyt & Company and Yellow Cake Plc, and writes for the AFR, holding the Companion of the Order of Australia title.



Katherine Barnet
Independent
Non-Executive Director

Katherine Barnet, a Chartered Accountant with 25+ years of experience, is a partner at Olvera Advisors in Sydney. She specializes in financial transactions, sustainable growth, and value optimization, with recent work in renewable energy, retail, property, and construction. She is a Fellow of CAANZ and ARITA and a member of the Australian Institute of Company Directors.



Roger Cressey
Executive Director
Commercial Operations

Roger Cressey has over 35 years of experience in the resource industry, mainly in gas exploration and production. He has held CEO, COO, and other executive roles in Australia (Queensland and NT), PNG, Indonesia, and Uganda. Roger excels in managing multi-disciplinary teams, strategy development, and stakeholder engagement.



Karl Schlobohm
Company Secretary & CFO

Karl Schlobohm, a Chartered Accountant and Fellow of the Governance Institute of Australia, has over 30 years of experience across various industries. He is a Non-Executive Director of the Australian Shareholders Association and has held multiple executive roles with listed companies on the ASX, LSE, AIM, and TSX in the natural resources sector.



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